Development of the Device-Oriented Subjective Outcome (DOSO) Scale

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WHY DO WE NEED ANOTHER QUESTIONNAIRE?

Research from our laboratory has indicated that many self-report outcome measures are associated with the personality of the hearing aid wearer. To illustrate this, the figure below depicts the extent to which outcome data from several popular questionnaires can be attributed to personality (Cox et al., 2007).

- Notice that questionnaires differ in the strength of their link to personality (e.g., HHV versus SHAPIE).
- Also note that even within a questionnaire (e.g., the SADL), some subscales are more closely linked to personality than others.

DEVELOPMENT OF ITEMS

From previous research, it appeared that the wording of the items is important in determining whether the item will elicit wearer-oriented or device-oriented data. Items can be fashioned to “point” towards the wearer or towards the hearing aid (device). This is demonstrated in the table below.

<table>
<thead>
<tr>
<th>Data-oriented</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device-oriented</td>
<td>&quot;how well does the hearing aid separate speech from noise?&quot;</td>
</tr>
<tr>
<td>Wearer-oriented</td>
<td>&quot;how well do you understand speech in a noisy place?&quot;</td>
</tr>
</tbody>
</table>

Seventy-five potential questionnaire items were developed using the strategy of “pointing” towards the hearing aid, whenever possible.

DATA COLLECTION & ITEM SELECTION

Subjects

Two groups of subjects were used for data collection:
- Laboratory subjects – 117 individuals who were fitted with bilateral hearing aids for field trials (2004-5).

Analyses

- Five items were omitted by >10% of subjects, so these items were eliminated, leaving 70 items.
- Eleven subjects omitted more than 10 of the remaining items, so these subjects were eliminated, leaving 295 subjects.
- Missing Value Analysis (MVA, SPSS version 16) was run to explore the patterns in the few remaining missing data points. This resulted in deletion of four more items, leaving 66.
- MVA was used for data imputation to replace the remaining missing data points (1.4% of items).
- Prince’s Components Analysis was run with 66 items and 295 subjects.
- Six components (capturing 64% of the outcome variance) satisfied theoretical and construct validity requirements and were retained.
- Items were selected from each component to comprise six subscales.

SUBSCALES & PSYCHOMETRIC PROPERTIES

<table>
<thead>
<tr>
<th>Subscale Name</th>
<th>Number of Items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech Cues A</td>
<td>7</td>
<td>.94</td>
</tr>
<tr>
<td>Speech Cues B</td>
<td>7</td>
<td>.94</td>
</tr>
<tr>
<td>Listening Effort A</td>
<td>5</td>
<td>.89</td>
</tr>
<tr>
<td>Listening Effort B</td>
<td>5</td>
<td>.86</td>
</tr>
<tr>
<td>Quietness</td>
<td>5</td>
<td>.81</td>
</tr>
<tr>
<td>Pleasanliness</td>
<td>4</td>
<td>.86</td>
</tr>
<tr>
<td>Convenience</td>
<td>4</td>
<td>.67</td>
</tr>
<tr>
<td>Use</td>
<td>3</td>
<td>.71</td>
</tr>
</tbody>
</table>

Are DOSO scores independent of personality?

A definitive answer to this question is not yet available. However, interim data are given below showing the association between scores on the PANAS personality test and the DOSO subscales.

DATA FROM THE FIELD SUBJECTS

These data suggest that four subscales are independent of personality, but the Listening Effort and Convenience subscales are associated with personality. Further research is needed on this question.

INTERIM NORMS FOR DOSO

Data from the field subjects were used to compute interim norms for the DOSO subscales. The DOSO is scored on a 1(worst) to 7(best) scale. The boxed area depicts the middle 50%. Bars show the 5th to 95th percentile range of scores.

TYPICAL SUBSCALE ITEMS

- How good are the hearing aids at......
  - Speech Cues: Picking up what strangers say the first time?
  - Listening Effort: Making conversation easier?
  - Quietness: Keeping background noise to a minimum?
  - Pleasanliness: Making your voice sound natural to you?
  - Convenience: Not using up batteries too fast?
  - Use: How many days a week do you usually wear hearing aids?

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   - Chuck Whitefield, M.S., Audiologist

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3. A PDF version of this poster can be obtained at: http://www.scup.memphis.edu/harl/